Portable Power System – 50 Watts

Ball Aerospace & Technologies Corp. has developed a small and lightweight portable fuel cell power system that supplies 50 watts of power at 12 volts. This fuel cell power system offers a possible alternative to batteries or generators. Ball Aerospace's fuel cell power system uses both oxygen from ambient air and externally supplied hydrogen to generate electricity to power sensors, scanners, video equipment, radio receivers, transmitters or other electrical devices.

Ball Aerospace & Technologies Corp.
1600 Commerce Street
Boulder, Colorado 80301
http://www.ballaerospace.com

(303) 939-6100
Fax: (303) 939-6104
E-mail: techops@ball.com

Application: *Any device that needs long-duration power such as:*

- Base power for communication and GPS
- Military mission power
- Repeater stations
- Motion detectors
- Vibration sensors
- Video recorder
- Emergency lighting

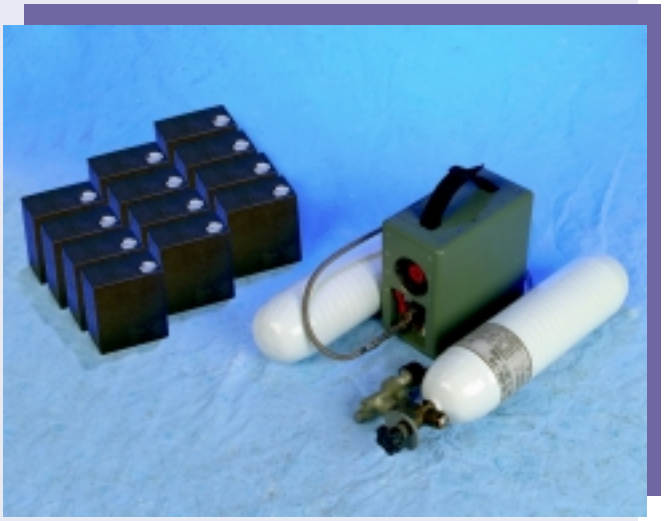
50-Watt Power System Specifications

Size (inches)	4.3x7.7x8
Weight (pounds)	6.5
Power (watts) at 12 volts	50
Peak Power (watts) >10 volts	65

Comparison to Batteries

Battery Type	Power (watts) at 12 volts	Energy (Wh)	System Weight (lb) per 1 kWh	Incremental Weight (lb) per 1 kWh[a]
BA5590 (Li SO_2) primary	30	150	13.2	13.2
BB390 (NiMH) rechargeable	20	86	46.2	46.2
BB590 (NiCd) rechargeable	60	53	76	76
Fuel Cell Power System	50	**	8.7[b] 11.5[c]	2.2[b] 5.0[c]

[a] *Additional weight for each kilowatt hour of energy*
[b] *Using Ball Aerospace's chemical hydride hydrogen source*
[c] *Using high-pressure hydrogen tanks*
*** 10,000 watt hours per pound hydrogen*



A portable power system with 1.8 kWh of H_2 energy (16.5 pounds) replaces 26.5 pounds of batteries.

Measuring 4.3x7.7x8 inches — approximately the size of a small lunch box — and weighing only 6.5 pounds, this power subsystem minimizes volume and weight, and is rugged, robust and weatherproof. The unit incorporates polycarbonate construction and will withstand shock, vibration and outdoor environments. By adding external breathing tubes, or snorkels, the power subsystem can be buried for unobtrusive or covert applications.

The power subsystem features near noise-free power and a low-thermal signature. It provides a user-friendly LCD interface for simple system start-up and shutdown. The internal controller monitors the output voltage and current to the equipment it is powering to ensure the system remains within limits. In addition, an RS232 data port is available for a computer to status and control the power system.

The system can use any commercially available hydrogen source as fuel. Using hydrogen and ambient air, Ball Aerospace's fuel cell uses two tanks to equal the power of 12 batteries. The commercially available, refillable high-pressure tanks shown, each contain about 900 Wh of energy. Ball Aerospace, with government support, is developing hydrogen sources that are smaller and lighter (1 kWh, 1 liter, l kilogram).

The system has been laboratory and field tested for reliability. If other voltages are required, an external dc-dc converter can be used.

Operational Specifications and Features

Start-up

Simple turn-on: Connect hydrogen supply, connect load, turn system on with the push of a button. After 1-minute system self-check, power is supplied to the load.

Operating environments

- -20 °C to 50 °C
- 0 to 95 percent rH
- Up to 9,000 feet
- Works in any position/orientation

Storage

- -20 °C to 70 °C

Noise

- Inaudible at 10 feet

Shock/Vibration

- Withstands 3-foot drop onto concrete

Reliability

- Low maintenance
- Autonomous/hands-free operation

Fuel Sources

Any hydrogen source with universal quick connect, regulated to <200 PSI.